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ABSTRACT

In October 1991, a labor market assessment was conducted to provide information and direction for the curriculum development and evaluation efforts of the Eastern Iowa Community College District's (EICCD's) Business Computer Programming (BCP) Program. The study focused on employment opportunities for and educational needs of personnel performing business computer programming functions. Surveys were sent to 96 local businesses believed to be employing business computer programmers, requesting information on the functions and training needs of computer personnel; minimum educational level and salary of entry-level computer programmers; immediate and projected job openings; and emerging trends. Study findings, based on a 35% response rate (N=33), included the following: (1) 92% of the respondents reported using microcomputers, with most (85%) using them for word processing; (2) 64% reported that they used mainframe computers, and 36% reported using mid-range computers; (3) 57.1% reported that an associate degree was the minimum educational level for full-time mainframe computer programmers; (4) respondents utilizing mainframe computers projected 111 job openings through 1994, while those using mid-range computers projected only 12 openings; (5) respondents using mainframe computers who have hired EICCD graduates recommended more emphasis on accounting, communication skills, and human relations skills in the BCP program; and (6) 85% of the respondents estimated that their company would send employees to community colleges for training. Data tables and the survey instrument are included. (PAA)

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LAB OR MARKET ASSESSMENT OF BUSINESS COMPUTER PROGRAMMING PERSONNEL FOR THE EASTERN IOWA COMMUNITY COLLEGE DISTRICT

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EASTERN IOWA COMMUNITY COLLEGE DISTRICT
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LABOR MARKET ASSESSMENT OF BUSINESS COMPUTER PROGRAMMING PERSONNEL FOR THE EASTERN IOWA COMMUNITY COLLEGE DISTRICT

I. INTRODUCTION

This labor market assessment was conducted to provide information and direction to the evaluation and curriculum development efforts of the Eastern Iowa Community College District's Business Computer Programming Program.

Information was gathered regarding employment opportunities and educational needs for personnel performing business computer programming functions.

II. THE STUDY

Target Population. A total of 96 business computer programming-related businesses within the Merged Area IX and Illinois Quad Cities were identified that were believed to be employing business computer programmers.

Data Collection, Tabulation and Analysis. The survey was mailed on October 10, 1991, to 96 computer programming-related businesses in the Merged Area IX and the Illinois Quad Cities area. A cover letter and return envelope accompanied the survey. A second copy of the survey was mailed on October 29, 1991 to those who did not respond before the stated deadline. A total of 34 surveys were returned; this represents 35% of the total population polled. Thirty-three of the responses were considered valid.

All surveys were tabulated and analyzed using the Statistical Package for the Social Sciences (SPSS).

The survey instrument requested information on the following:

Survey Design

1. Functions, languages, and training needs of personnel working with microcomputers, mainframe computers, and mid-range computers;
2. Minimum educational level, hiring source and entry-level salary range of computer programming-related personnel;
3. Immediate and projected job openings for computer programming-related personnel;
4. Training needs and emerging trends in the field of computers.

The cover letters and survey instrument are given in Appendix A.

III. SURVEY RESULTS: MERGED AREA IX AND ILLINOIS QUAD CITIES

Type of Organization. The respondents were from a variety of organizational settings. Nine (27.3%) of the respondents were from the wholesale/retail sectors. For complete results see Table 1.

Table 1
Type of Organization

	Number	Percent
Banking/Finance	2	6.1
Government	4	12.1
Hospital/Health Care Facility	4	12.1
Insurance	5	15.2
Manufacturing	4	12.1
Public Accounting	1	3.0
Wholesale/Retail	9	27.3
Utility	1	3.0
Other	3	9.1
Total	33	100.0

Size of Organization. The largest percentage of respondents (24.2%) indicated an organization size of over 1000 employees. This is illustrated in Table 2.

Table 2
Size of Organization

	Number	Percent
1-4	1	3.0
5-9	2	6.1
10-19	1	3.0
20-49	4	12.1
50-99	6	18.2
100-249	5	15.2
250-499	3	9.1
500-999	3	9.1
1000+	8	24.2
Total	33	100.0

Uses of Microcomputers. Thirty (90.9%) respondents indicated that they used microcomputers in their organization. The majority (84.8%), use microcomputers for word processing. 75.8% use microcomputers for data base management and spreadsheets. The respondents could select more than one microcomputer function. See Table 3.

Table 3
Uses of Microcomputers

Functions	Number	Percent
Word processing	28	84.8
Data base management system	25	75.8
Spreadsheets	25	75.8
Graphics/desktop publishing	19	57.6
CAD	9	27.3

Note: The respondents could select more than one microcomputer function.

Use of Microcomputer Programming Language(s). Approximately half (46.7%) of the respondents who use microcomputers use microcomputer programming languages to create their own business applications. See Table 4.

Table 4
Use Microcomputer Programming Languages

	Number	Percent
Yes	14	46.7
No	15	50.0
No Response	1	3.3
Total	30	100.0

COMPUTER PROGRAMMING LANGUAGES

Use of Microcomputer Languages. Of the 14 microcomputer users who create their own business applications, 57.1% use BASIC, and 50.0% use D Base III or IV. For complete results see Table 5.

Table 5
Use of Microcomputer Languages

Languages	Number	Percent
BASIC	8	57.1
Pascal	1	7.1
C	4	28.6
Assembler	2	14.3
Fortran	1	7.1
D Base III or IV	7	50.0
Clarion	1	7.1
Periodox	1	7.1
Fox Pro	2	14.3
Smartware	2	14.3
Other	3	21.4

Note: Respondents could select more than one microcomputer language.

Use of Mainframe Languages. Twenty-one (63.6%) of the respondents indicated that they use mainframe computers. Ten of these respondents (47.6%) indicated strong use of COBOL. For complete results see Table 6.

Table 6

Use of Mainframe Languages

	Not Used		Seldom Used		Used		Strong Use	
	#	%	#	%	#	%	#	%
Programming Languages								
COBOL	2	9.5	-	-	2	9.5	10	47.6
RPG II	7	33.3	1	4.8	1	4.8	4	19.1
RPG III	7	33.3	1	4.8	1	4.8	1	4.8
BAL	6	28.6	3	14.3	2	9.5	-	-
FORTRAN	6	28.6	1	4.8	3	14.3	-	-
PL/1	9	42.9	1	4.8	-	-	2	9.5
Other	6	28.6	1	4.8	1	4.8	2	9.5
Data Base Management Systems								
DB2	5	23.8	1	4.8	3	14.3	2	9.5
IMS	6	28.6	2	9.5	2	9.5	1	4.8
SQL	5	23.8	2	9.5	2	9.5	1	4.8
Other	2	9.5	1	4.8	-	-	3	14.3
Interactive/Online Systems								
CICS	3	14.3	1	4.8	3	14.3	5	23.8
CSP	6	28.6	1	4.8	1	4.8	1	4.8

Use of Mid-range Languages. Twelve (36.4%) of the respondents indicated that they used mid-range computers. Four (33.3%) of these respondents indicated strong use of RPG/400. See Table 7 for complete results.

Table 7
Use of Mid-Range Languages

	Not Used		Seldom Used		Used		Strong Use	
	#	%	#	%	#	%	#	%
Programming Languages								
COBOL	4	33.3	2	16.7	1	8.3	3	25.0
RPG II	3	25.0	-	-	1	8.3	2	16.7
RPG III	3	25.0	-	-	1	8.3	2	16.7
RPG/400	3	25.0	-	-	1	8.3	4	33.3
Other	1	8.3	-	-	-	-	-	-
Data Base Management Systems								
Other	1	8.3	-	-	3	25.0	4	33.3
Interactive/Online Systems								
Other	1	8.3	-	-	1	8.3	2	16.7

COMPUTERS INSTALLED

Mainframe Computers Installed. The respondents were asked to indicate the mainframe computers currently installed in their firm/facility and those they plan to install. The complete results are provided in Table 8.

Table 8

Mainframe Computers Installed

Vendor	Model/Type	Number Installed	Number Planned To Install	Operating System
Data General	MV 20,000	2	N/A	AOS/VS
Data General	MV 9,500		2	AOS/VS/SOS
DEC	VAX 3,400	1	1	MVMPS
Digital	VAX 8250	1		VMS
Data General	Aviion 41	1		UNIX
EBS, INC	IBM RS600			
Hewlett Pack.	HP3000/98	1		MPE/XL
IBM	AS/400 D4	2		OS/400
IBM	AS/400-D6	1	0	OS/400
IBM	3081K	1		MVS/XA
IBM	3090	9		MVS
IBM	4381 P13	1		DOS/USE/ESA
IBM	9120	1		MVS/XA, ESA
IBM	9121	1		MVS/ESA
IBM	ES 9000 2	1		MVS/ESA
IBM	ES 9121	1		MVS-XA
IBM	Sys/36	1		
IBM	System 36			
IBM	System 36	1	0	
Unisys	1190	2		
Unisys	2200/611,	1		
Unisys	B28	1		GAP

Mid-Range Computers Installed. The respondents were asked to indicate the mid-range computers currently installed in their firm/facility and those they plan to install. The complete results are provided in Table 9.

Table 9
Mid-Range Computers Installed

Vendor	Model/Type	Number Installed	Number Planned To Install	Operating System
Derby Tech	386 AT Server	1		Novell
?	386 AT Server	1		Novell
Data General	MV 2000	1		AOS/VS
Elec. Bus. Equipment		15	0	
Hewlett Pack.	58	1	0	MPE/XL
Hewlett Pack.	960	1	0	MPE/XL
Hewlett Pack.	HP 9000/400 dl's	14	12	HP-UX
Hewlett Pack.	HP 9000/8xx	2	4	HP-UX
IBM	AS/400	1		OS/400
IBM	AS/400	1		OS/400
IBM	AS/400	2	1	OS/400
IBM	AS/400	108	4	
IBM	AS/400 345	1		OS/400
IBM	AS/400 D10's		15	OS/400
IBM	AS/400-D60	1	0	OS/400
IBM	S/38 400		16	S/38
IBM	System 36	1		

MINIMUM EDUCATIONAL LEVEL

Minimum Education of Business Computer Programming-Related Personnel. The respondents were asked to indicate the minimum level of education their organization normally requires for full-time business computer programming-related personnel. Results are broken down into two sections: Table 10 indicates the minimum educational level for personnel working with mainframe computers; and Table 11 indicates the minimum educational level for personnel working with mid-range computers.

Table 10

Minimum Educational Level of Mainframe Computer Personnel

	High School		Certificate		Associate		Bachelor		Masters	
	#	%	#	%	#	%	#	%	#	%
Data Entry	17	81.0	-	-	1	4.8	1	4.8	-	-
Computer Operator	8	38.1	4	19.1	7	33.3	-	-	-	-
Operations Analyst	2	9.5	-	-	8	38.1	-	-	-	-
Programmer	-	-	-	-	12	57.1	3	14.3	-	-
Programmer/Analyst	-	-	-	-	7	33.3	6	28.6	-	-
Systems Analyst	-	-	-	-	5	23.8	8	38.1	1	4.8
Systems Programmer	-	-	-	-	6	28.6	6	28.6	-	-
Data Processing Manager	-	-	-	-	1	4.8	12	7.1	-	-
Other	1	4.8	1	4.8	1	4.8	1	4.8	-	-

Table 11

Minimum Educational Level of Mid-Range Computer Personnel

	High School		Certificate		Associate		Bachelor		Masters	
	#	%	#	%	#	%	#	%	#	%
Data Entry	9	75.0	-	-	-	-	-	-	-	-
Computer Operator	3	25.0	4	33.3	2	16.7	-	-	-	-
Programmer	-	-	-	-	5	41.7	1	8.3	-	-
Programmer/Analyst	-	-	-	-	5	41.7	2	16.7	-	-
Systems Analyst	-	-	-	-	2	16.7	3	25.0	-	-
Systems Programmer	-	-	-	-	-	-	4	33.3	-	-
Data Processing Manager	-	-	-	-	2	16.7	5	41.7	-	-
Other	-	-	-	-	-	-	3	25.0	-	-

PRIMARY HIRING SOURCE

Primary Hiring Source. The respondents were asked to indicate the primary hiring source for full-time business computer programming-related personnel in their firm/facility. Table 12 indicates the primary hiring source for personnel working with mainframe computers. Table 13 indicates the primary hiring source for personnel working with mid-range computers.

Table 12

Primary Hiring Source for Mainframe Computer Personnel

	Within Data Processing		Within Company		Employment Agency		Community College		College/ University		Other	
	#	%	#	%	#	%	#	%	#	%	#	%
Data Entry	-	-	6	28.6	3	14.3	5	23.8	-	-	2	9.5
Computer Operator	-	-	6	28.6	4	19.1	6	28.6	-	-	2	9.5
Operations Analyst	-	-	4	19.1	1	4.8	2	9.5	-	-	1	4.8
Programmer	1	4.8	1	4.8	5	23.8	4	19.1	-	-	1	4.8
Programmer/Analyst	1	4.8	2	9.5	5	23.8	1	4.8	1	4.8	-	-
Systems Analyst	1	4.8	4	19.1	3	14.3	-	-	2	9.5	-	-
Systems Programmer	-	-	4	19.1	4	19.1	1	4.8	1	4.8	-	-
Data Processing Manager	-	-	6	28.6	4	19.1	1	4.8	1	4.8	-	-
Other	1	4.8	1	4.8	-	-	-	-	-	-	-	-

Table 13

Primary Hiring Source for Mid-Range Computer Personnel

	Within Data Processing		Within Company		Employment Agency		Community College		College/ University		Other	
	#	%	#	%	#	%	#	%	#	%	#	%
Data Entry	-	-	4	33.3	2	16.7	-	-	-	-	-	-
Computer Operator	-	-	4	33.3	2	16.7	-	-	-	-	1	8.3
Programmer	-	-	1	8.3	2	16.7	-	-	-	-	-	-
Programmer/Analyst	-	-	1	8.3	4	33.3	-	-	-	-	-	-
Systems Analyst	-	-	-	-	2	16.7	-	-	1	8.3	-	-
Systems Programmer	-	-	1	8.3	1	8.3	-	-	-	-	-	-
Data Processing Manager	-	-	2	16.7	2	16.7	-	-	-	-	1	8.3

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ENTRY-LEVEL ANNUAL SALARY RANGE

Entry-Level Annual Salary Range. The respondents were asked to indicate the entry-level annual salary range of full-time business computer programming-related personnel. The entry-level salary ranges varied greatly, from $10,000-$12,000 per year to $30,000 and over per year. Those job categories which showed the highest entry-level salary ranges were data processing manager, systems programmer, and systems analyst. The categories which showed the lowest entry-level salary ranges included data entry and computer operator. The percents listed in Tables 14 and 15 are based upon those respondents who indicated the salary range of their employees.

Table 14

Entry-level Annual Salary Range for Mainframe Computer Personnel

	$10,000-$12,999		$13,000-$15,999		$16,000-$19,999		$20,000-$24,999		$25,000-$29,999		$30,000 & OVER	
	#	%	#	%	#	%	#	%	#	%	#	%
Data Entry	6	28.6	9	42.9	3	14.3	-	-	-	-	1	4.8
Computer Operator	2	9.5	2	9.5	9	42.9	3	14.3	2	9.5	-	-
Operations Analyst	-	-	-	-	2	9.5	3	14.3	2	9.5	1	4.8
Programmer	-	-	-	-	1	4.8	5	23.8	6	28.6	1	4.8
Programmer/Analyst	-	-	-	-	-	-	3	14.3	4	19.1	5	23.8
Systems Analyst	-	-	-	-	-	-	-	-	2	9.5	10	47.6
Systems Programmer	-	-	-	-	-	-	1	4.8	-	-	10	47.6
Data Processing Manager	-	-	-	-	1	4.8	-	-	-	-	12	57.1
Other	-	-	-	-	-	-	1	4.8	1	4.8	-	-

Table 15

Entry-Level Annual Salary Range for Mid-Range Computer Personnel

	$10,000-$12,000		$13,000-$15,999		$16,000-$19,999		$20,000 $24,999		$25,000-$29,999		$30,000 & OVER	
	#	%	#	%	#	%	#	%	#	%	#	%
Data Entry	3	25.0	6	50.0	-	-	-	-	-	-	-	-
Computer Operator	-	-	3	25.0	3	25.0	3	25.0	-	-	-	-
Programmer	-	-	-	-	-	-	2	16.7	2	16.7	-	-
Programmer/Analyst	-	-	-	-	-	-	2	16.7	2	16.7	2	16.7
Systems Analyst	-	-	-	-	-	-	-	-	2	16.7	2	16.7
Systems Programmer	-	-	-	-	-	-	-	-	-	-	3	25.0
Data Processing Manager	-	-	-	-	-	-	-	-	-	-	5	41.7

EMPLOYMENT PROJECTIONS

Employment Projections. The respondents were asked to indicate the number of current and projected business computer programming-related openings. The respondents that utilize mainframe computers projected a total of 111 openings from October 1991 through 1994. The job category with the largest number of projected openings is programmer/analyst (32), followed by programmer (20). The respondents that utilize mid-range computers projected a total of 12 openings from October 1991 through 1994. The job categories indicating the greatest number of openings are computer operator (8) and data entry (5).

Table 16

MAINFRAME: NUMBER OF OPENINGS

Job Categories	Oct.-Dec. 1991	1992	1993	1994	Total
Data Entry	2	5	6	5	18
Computer Operator	2	3	2	1	8
Operations Analyst	0	1	1	1	3
Programmer	4	6	6	4	20
Programmer/Analyst	5	11	8	8	32
Systems Analyst	0	5	5	5	15
Systems Programmer	0	5	5	5	15
Data Processing Manager	0	0	0	0	0
Other	0	0	0	0	0
Total	13	36	33	29	111

Table 17

MID-RANGE: NUMBER OF OPENINGS

Job Categories	Oct.-Dec 1991	1992	1993	1994	Total
Data Entry	0	2	0	0	2
Computer Operator	0	2	1	1	4
Programmer	0	2	0	0	2
Programmer/Analyst	0	2	0	0	2
Systems Analyst	0	1	0	0	1
Systems Programmer	0	0	1	0	1
Data Processing Manager	0	0	0	0	0
Totals	0	9	2	1	12

COMPUTER TRAINING NEEDS

Microcomputer training needs. Of the 30 respondents who indicated their organization uses microcomputers, 26 (86.7%) responded to this section, indicating the microcomputer training needs for their personnel. The percentages in Table 18 are based on those that responded to this section.

Table 18

MICROCOMPUTER TRAINING NEEDS

	No Need		Need		Strong Need	
	#	%	#	%	#	%
Hardware/Equipment Use	6	23.0	18	69.2	1	3.9
Operating System	6	23.0	16	61.5	4	15.4
BASIC Computing Concepts & Terminology	8	30.8	11	42.3	5	19.2
Applications Software	14	53.8	6	23.1	4	15.4
Wordprocessing	6	23.0	14	53.9	6	23.1
Spreadsheet	5	19.2	16	61.5	4	15.4
Data Base Management	6	23.0	14	53.9	3	11.5
Project Management	13	50.0	7	26.9	2	7.7
Keyboarding	12	46.1	10	38.5	1	3.9
Graphics	10	38.5	13	50.0	0	0.0
Networking	9	34.6	10	38.5	4	15.4
BASIC	13	50.0	6	26.1	2	7.7
C	14	53.8	5	19.2	2	7.7
Other	0	-	1	3.9	1	3.9

Mainframe Computer Training Needs. Eighteen (85.7%) of the 21 respondents who indicated their firm/facility used mainframe computers responded to this section, indicating the training needs for their data processing personnel. The percentages in Table 19 are based on those that responded to this section.

Table 19

MAINFRAME COMPUTER TRAINING NEEDS

	No Need		Need		Strong Need	
	#	%	#	%	#	%
BASIC Computing Conc						
Data Base Management	pts & Terminology	13	72.2	2	11.1	3	16.7
Data Communications		9	50.0	8	44.4	1	5.5
Management Informati		7	38.9	7	38.9	4	22.2
Operating Systems	n Systems	10	55.6	6	33.3	3	16.7
Networking		8	44.4	8	44.4	2	11.1
Computer Operations		8	44.4	6	33.3	5	27.8
Programming Language		11	61.1	5	27.8	2	11.1
Interactive/Online P		11	61.1	6	33.3	1	5.5
Other	rogramming	10	55.6	7	38.9	1	5.5
		3	16.7	1	5.6	2	11.1

Mid-range Computer T raining Needs. Seven (58.3%) of the 12 respondents who ind cated their facility used mid-range computers responded to this s ction, indicating the training needs of their data processing per onnel. The percentages in Table 20 are based on those that respo ded to this section.

Table 20

MID-RANGE COMPUTER TRAINING NEEDS

	No Need		Need		Strong Need	
	#	%	#	%	#	%
BASIC Computing Conc						
Data Base Management	pts & Terminology	3	42.9	2	28.6	2	28.6
Data Communications		2	28.6	3	42.9	2	28.6
Management Informati		2	28.6	3	42.9	2	28.6
Operating Systems	n Systems	2	28.6	3	42.9	2	28.6
Networking		2	28.6	3	42.9	2	28.6
Computer Operations		2	28.6	2	28.6	3	42.9
Programming Language		2	28.6	3	42.9	2	28.6
Application Develop		2	28.6	3	42.9	2	28.6
	nt Tools	3	42.9	3	42.9	1	14.3

RECOMMENDED CHANGES IN BCP PROGRAM

Recommended Changes in BCP Program--Mainframe. The respondents who use mainframe computers and have hired EICCD graduates were asked to indicate the direction EICCD should take in making changes to the existing Business Computer Programming (BCP) program requirements. Fifty percent or more of the twelve respondents recommended more emphasis in accounting, communication skills, and human relations skills. "Other" recommended changes in the BCP program were more emphasis in CICS and Database. Refer to Table 21.

Table 21

MAINFRAME: RECOMMENDED CHANGES IN BCP PROGRAM

	More Emphasis		Less Emphasis		No Change	
	#	%	#	%	#	%
Accounting	6	50.0	-	-	6	50.0
Mathematics	4	33.3	-	-	8	66.7
Communication Skills	8	66.7	-	-	4	33.3
Human Relations Skills	8	66.7	-	-	4	33.3
Other	2	16.7	-	-	1	8.3

Recommended Changes in BCP Program--Mid-Range. The respondents who use mid-range computers and have hired EICCD graduates were asked to indicate the direction EICCD should take in making changes to the existing BCP program requirements. The one respondent recommended no change in the accounting and mathematics requirements, and more emphasis in communication skills and human relations skills. Refer to Table 22.

Table 22

MID-RANGE: RECOMMENDED CHANGES IN BCP PROGRAM

	More Emphasis		Less Emphasis		No Change	
	#	%	#	%	#	%
Accounting	-	-	-	-	1	100.0
Mathematics	-	-	-	-	1	100.0
Communication Skills	1	100.0	-	-	-	-
Human Relations Skills	1	100.0	-	-	-	-

Methods of Training. All of the respondents were asked to indicate the method(s) of training used to update the computer skills of their employees. 81.8% use on-the-job training, 57.6% use in-house training seminars, and 54.5% use external training seminars and professional association workshops/classes. Note: The respondents could select more than one method of training. See Table 23.

Table 23

Methods of Training

	Number	Percent
On-the-job training	27	81.8
In-house training seminars	19	57.6
External training seminars	18	54.5
Community college courses	9	27.3
Professional association workshop/classes	18	54.5
No training provided	1	3.0

Note: The respondents could select more than one method of training.

Send Employees to Community College. Twenty-two (84.6%) respondents estimated that their company would send employees to a community college for training.

Formats of Training. The respondents were asked to indicate the format(s) of training which they prefer for their employees: 48.5% preferred in-house training, 30.3% preferred one-day seminars and multiple-day seminars. The complete results are provided in Table 24.

Table 24

Formats of Training

	Number	Percent
Day classes	4	12.1
Evening	7	21.2
One-day seminars	10	30.3
Multiple-day seminars	10	30.3
In-house training	16	48.5
Other training	1	3.0

Note: The respondents could select more than one format of training.

Emerging Trends in Computer Field. In an open-ended question, the respondents were asked what they see as the emerging trends in the field of computers. Responses such as the following were written.

- "Businesses heading toward standardization of hardware and software in a network environment. This trend requires companies to invest in training and/or acquire in-house system administrators."
- "Networking and accessibility to applications across different platforms from a single device."
- "Networking and integrated software."
- "Less in-house programming in favor of buying outside packages due to increased power of the central processing units (CPU's)."
- Downsizing of data processing and doing less in-house development of applications programs.
- Greater need for data processing personnel who can communicate effectively.
- "Programming on PC's for upload to mainframe...Transactions entered on PC's to offlead mainframe, but upload to mainframe to process at night."
- Use of image systems.
- More emphasis on PC's emulating with hosts.
- A trend toward using XENIX rather than DOS.
- "Extensive use of personal computers, relational data bases, case tools, and communication links."

Implications of Trends for Future Personnel Needs. The respondents were asked what the implications of these trends would be for their future personnel needs.

- "We will need UNIX(OSF) experts, MS-DOS experts, and relational database experts (i.e., data modeling experts.)"
- "Personnel familiar with tools to access applications across different platforms."
- "Education in the PC area (i.e., languages, tools, networks, communication links, hardware, and troubleshooting.)"

- "More knowledge of operating systems and software is needed."

- "We will require development of "assistant" system administrator who functions in other areas but can do "BASIC" system administration and troubleshooting..."

- "Long term reduction in number of people needed to support mainframe systems."

Specific Courses/Seminars/Workshops for Employee Education/ Training Needs. In an open-ended question the respondents were asked to list specific courses, seminars and workshops the Eastern Iowa Community College District might offer to meet their employee education/training needs.

Suggestions include:

- FOXBASE and BASIC programming languages

- "Night courses in C language--no one in the area currently provides this."

- PC hardware troubleshooting

- Setting up networks/network administration

- Network programming--TCIP socket to socket programming techniques

- XENIX system administration and BASIC XENIX classes

- UNIX/OSF training

- Relational DB training to include SQL, 5 + 5 normal form, data modeling, referential integrity, etc.

- AS400 training

- Logical database design and prototyping

- Hands-on OS2/CICS COBOL class

- Spreadsheet training

- Seminars for programmers/system analysts on supervision and communicating with users (non-dp personnel)

- Employees are able to use computers but typing skills are poor--slow and inaccurate

Additional Comments. The respondents were given an opportunity to write additional comments.

- "The instructor for these classes would need the ability to teach non-technical people and should include examples as well as lab time."
- "Buy a AS/400 and begin to train on it."
- "I feel that all four areas (accounting, mathematics, communication skills, and human relations skills) are important to the continued success of anyone choosing a career in data processing."
- "I graduated from Scott and it was an excellent place to learn." (Survey respondent indicated he/she is a computer maintenance technician.)

SUMMARY AND CONCLUSIONS OF THE BUSINESS COMPUTER PROGRAMMING PERSONNEL LABOR MARKET ASSESSMENT FOR THE EASTERN IOWA COMMUNITY COLLEGE DISTRICT

In October 1991, a survey was conducted of 96 business computer programming-related businesses within Merged Area IX and the Illinois Quad Cities that were believed to be employing business computer programmers. A total of 34 surveys were returned; this represents 35% of the total population polled. Thirty-three of the responses were considered valid. To keep the summary brief, the following tables indicate the survey results only for those positions most commonly obtained by SCC graduates: computer operator, programmer and programmer analyst.

Highlights

1. Thirty (91%) respondents indicated that they used microcomputers in their organization. The majority (85%), use microcomputers for word processing. 76% use microcomputers for data base management and spreadsheets.

2. Approximately half (47%) of the respondents who use microcomputers use microcomputer programming languages to create their own business applications. Of the 14 microcomputer users who create their own business applications, 57% use BASIC, and 50% use D Base III or IV.

3. Twenty-one (64%) of the respondents indicated that they use mainframe computers. Ten of these respondents (48%) indicated strong use of COBOL. Twelve (36%) of the respondents indicated that they used mid-range computers. Four (33%) of these respondents indicated strong use of RPG/400.

4. The respondents indicated the minimum level of education their organization normally requires for full-time business computer programming-related personnel. Results are broken down into two sections: Table 1 indicates the minimum educational level for personnel working with mainframe computers; Table 2 indicates the minimum educational level for personnel working with mid-range computers.

Table 1

Minimum Educational Level of Mainframe Computer Personnel

	High School		Certificate		Associate		Bachelor		Masters	
	#	%	#	%	#	%	#	%	#	%
Computer Operator	8	38.1	4	19.1	7	33.3	-	-	-	-
Programmer	-	-	-	-	12	57.1	3	14.3	-	-
Programmer/Analyst	-	-	-	-	7	33.3	6	28.6	-	-

Table 2

Minimum Educational Level of Mid-Range Computer Personnel

	High School		Certificate		Associate		Bachelor		Masters	
	#	%	#	%	#	%	#	%	#	%
Computer Operator	3	25.0	4	33.3	2	16.7	-	-	-	-
Programmer	-	-	-	-	5	41.7	1	8.3	-	-
Programmer/Analyst	-	-	-	-	5	41.7	2	16.7	-	-

5. The respondents indicated the primary hiring source for full-time business computer programming-related personnel in their firm/facility.

Table 3

Primary Hiring Source for Mainframe Computer Personnel

	Within Data Processing		Within Company		Employment Agency		Community College		College/ University		Other	
	#	%	#	%	#	%	#	%	#	%	#	%
Computer Operator	-	-	6	28.6	4	19.1	6	28.6	-	-	2	9.5
Programmer	1	4.8	1	4.8	5	23.8	4	19.1	-	-	1	4.8
Programmer/Analyst	1	4.8	2	9.5	5	23.8	1	4.8	1	4.8	-	-

Table 4

Primary Hiring Source for Mid-Range Computer Personnel

	Within Data Processing		Within Company		Employment Agency		Community College		College/ University		Other	
	#	%	#	%	#	%	#	%	#	%	#	%
Computer Operator	-	-	4	33.3	2	16.7	-	-	-	-	1	8.3
Programmer	-	-	1	8.3	2	16.7	-	-	-	-	-	-
Programmer/Analyst	-	-	1	8.3	4	33.3	-	-	-	-	-	-

6. The respondents indicated the entry-level annual salary range of full-time business computer programming-related personnel. The percents listed in the following tables are based upon those respondents who indicated the salary range of their employees.

Table 5

Entry-level Annual Salary Range for Mainframe Computer Personnel

	$10,000-$12,999		$13,000-$15,999		$16,000-$19,999		$20,000-$24,999		$25,000-$29,999		$30,000 & OVER	
	#	%	#	%	#	%	#	%	#	%	#	%
Computer Operator	2	9.5	2	9.5	9	42.9	3	14.3	2	9.5	-	-
Programmer	-	-	-	-	1	4.8	5	23.8	6	28.6	1	4.8
Programmer/Analyst	-	-	-	-	-	-	3	14.3	4	19.1	5	23.8

Table 6

Entry-Level Annual Salary Range for Mid-Range Computer Personnel

	$10,000-$12,000		$13,000-$15,999		$16,000-$19,999		$20,000 $24,999		$25,000-$29,999		$30,000 & OVER	
	#	%	#	%	#	%	#	%	#	%	#	%
Computer Operator	-	-	3	25.0	3	25.0	3	25.0	-	-	-	-
Programmer	-	-	-	-	-	-	2	16.7	2	16.7	-	-
Programmer/Analyst	-	-	-	-	-	-	2	16.7	2	16.7	2	16.7

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7. The respondents that utilize mainframe computers projected a total of 111 openings from October 1991 through 1994. The job category with the largest number of projected openings is programmer/analyst (32), followed by programmer (20). The respondents that utilize mid-range computers projected a total of 12 openings from October 1991 through 1994. The following tables indicate projected openings only for the job categories of computer operator, programmer and programmer/analyst.

Table 7

MAINFRAME: NUMBER OF OPENINGS

Job Categories	Oct.-Dec. 1991	1992	1993	1994	Total
Computer Operator	2	3	2	1	8
Programmer	4	6	6	4	20
Programmer/Analyst	5	11	8	8	32

Table 8

MID-RANGE: NUMBER OF OPENINGS

Job Categories	Oct.-Dec 1991	1992	1993	1994	Total
Computer Operator	0	2	1	1	4
Programmer	0	2	0	0	2
Programmer/Analyst	0	2	0	0	2

8. The respondents who use mainframe computers and have hired EICCD graduates were asked to indicate the direction EICCD should take in making changes to the existing Business Computer Programming (BCP) program requirements. Fifty percent or more of the twelve respondents recommended more emphasis in accounting, communication skills, and human relations skills. "Other" recommended changes in the BCP program were more emphasis in CICS and Database.

9. Respondents indicated the method(s) of training used to update the computer skills of their employees. 82% use on-the-job training, 58% use in-house training seminars, and 55% use external training seminars and professional association workshops/classes. Twenty-two (85%) respondents estimated that their company would send employees to a community college for training.

10. The respondents indicated the format(s) of training which they prefer for their employees: 49% preferred in-house training, 30% preferred one-day seminars and multiple-day seminars.

11. In an open-ended question, the respondents provided what they see as the emerging trends in the field of computers. Responses such as the following were written.

    - "Businesses heading toward standardization of hardware and software in a network environment. This trend requires companies to invest in training and/or acquire in-house system administrators."

    - "Less in-house programming in favor of buying outside packages due to increased power of the central processing units (CPU's)."

    - Greater need for data processing personnel who can communicate effectively.

    The respondents were asked what the implications of these trends would be for their future personnel needs.

    - "Personnel familiar with tools to access applications across different platforms."

    - "Education in the PC area (i.e., languages, tools, networks, communication links, hardware, and troubleshooting.)"

    - "More knowledge of operating systems and software is needed."

    - "We will require development of "assistant" system administrator who functions in other areas but can do "BASIC" system administration and troubleshooting..."

    - "Long term reduction in number of people needed to support mainframe systems."

APPENDIX A

CLINTON COMMUNITY COLLEGE
SCOTT COMMUNITY COLLEGE
MUSCATINE COMMUNITY COLLEGE

EASTERN IOWA COMMUNITY COLLEGE DISTRICT

306 West River Drive • Davenport, Iowa • 52801-1221 • (319) 322-5015

October 10, 1991

Dear Data Processing Manager:

The Eastern Iowa Community College District strives to offer quality educational programs to all students. Our programs are carefully designed to meet both the needs of our students and those of the job market.

Your responses to this survey will assist us in obtaining a more complete employment picture of the computer field. No employer will be identified in the results of these surveys and all responses will be kept in confidence.

Thank you for your time in completing this survey. Input from employers is a most valuable resource in the continual improvement of our educational offerings. Please return the completed survey in the enclosed envelope by October 24.

If you have any questions regarding this survey, please contact Cindy Lake at (319) 322-5015 ext. 248.

Sincerely,

John T. Blong
Chancellor

JTB/ghw

Enclosure

CLINTON COMMUNITY COLLEGE
SCOTT COMMUNITY COLLEGE
MUSCATINE COMMUNITY COLLEGE

EASTERN IOWA COMMUNITY COLLEGE DISTRICT

306 West River Drive • Davenport, Iowa • 52801-1221 • (319) 322-5015

October 29, 1991

Dear Data Processing Manager:

You should have recently received a business computer programming survey in the mail. Your responses to this survey will assist us in obtaining a more complete employment picture of the computer field. No employer will be identified in the results of this survey and all responses will be kept in confidence.

Thank you for taking a few minutes to complete this survey. Input from employers is a valuable resource in the continual improvement of our educational offerings. Please return the completed survey in the enclosed envelope by November 8, 1991. If you have already completed and mailed the business computer programming survey, please disregard.

If you have any questions regarding this survey, please call Cindy Lake at (319)322-5015 ext. 248.

Sincerely,

John T. Blong

John T. Blong
Chancellor

Enclosures
JTB/ghw

CLINTON COMMUNITY COLL
SCOTT COMMUNITY COLLEGE
MUSCATINE COMMUNITY COLLEGE

EASTERN IOWA COMMUNITY COLLEGE DISTRICT

306 West River Drive • Davenport, Iowa • 52[illegible]01-1221 • (319) 322-5015

III

BUSINESS COMPUTER PROGRAMMING SURVEY

The purpose of this survey is to assist the Eastern Iowa Community College District in gathering information about employment trends and educational needs in the computer field. Your answers will provide direction to our future programming efforts. All responses are confidential, and the names of institutions replying will not be released. We appreciate the time you will take to complete this survey.

Please indicate your response by circling the number corresponding to your choice or by providing the information requested.

V

1-2) 1. Which of the following would best describe your organization? (Circle one.)

1. Banking/Finance
2. School
3. Engineering
4. Government
5. Hospital/Health Care Facility
6. Insurance
7. Law
8. Manufacturing
9. Public Accounting
10. Real Estate
11. Transportation
12. Wholesale/Retail
13. Utility
14. Other (please specify) _____

3) 2. What is the total number of full-time and part-time employees in your organization? (Circle one.)

1. 1-4
2. 5-9
3. 10-19
4. 20-49
5. 50-99
6. 100-249
7. 250-499
8. 500-999
9. 1000+

4) 3. Does your firm/facility currently use microcomputers? (Circle one.)

1. If YES, please answer the questions in Section A.
2. If NO, please skip to question Number 8.

SECTION A: Firms utilizing microcomputers answer the questions in this section.

4. Please indicate the functions for which microcomputers are used in your firm/facility. (Circle all that apply.)

5) 1. Word processing
6) 2. Data base management system
7) 3. Spread sheets
8) 4. Graphics/desktop publishing
9) 5. CAD

10) 5. Does your firm/facility use any microcomputer programming language(s) to create its own business applications?

1. If YES, please answer question Number 6.
2. If NO, please skip to question Number 7.

6. Please indicate which programming languages are being used. (Circle all that apply.)

11) 1. Basic
12) 2. Pascal
13) 3. C
14) 4. Assembler
15) 5. Fortran
16) 6. D Base III or IV
17) 7. Clarion
18) 8. Peridox
19) 9. Fox Pro
20) 10. Smartware
21) 11. Other (please specify): _____

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7. Please indicate the microcomputer training needs for your personnel. (Place an "X" in the appropriate column for each item.)

		1 No Need	2 Need	3 Strong Need
22)	Hardware/Equipment Use			
23)	Operating System			
24)	Basic Computing Concepts and Terminology			
25)	Applications Software (Inventory, Payroll, etc.)			
26)	Wordprocessing			
27)	Spreadsheet			
28)	Data Base Management			
29)	Project Management			
30)	Keyboarding			
31)	Graphics			
32)	Networking			
33)	Basic			
34)	C			
35)	Other (please specify):			

36) 8. Does your firm/facility currently use mainframes?
1. If YES, please answer the questions in Section B.
2. If NO, please skip to question Number 14.

SECTION B: Firms utilizing mainframes answer the questions in this section.

---

9. Which of the following programming languages, data base management systems, and interactive/online systems are used by your firm/facility? (Please place an "X" in the appropriate column for each item listed.)

		1 Not Used	2 Seldom Used	3 Used	4 Strong Use
	PROGRAMMING LANGUAGES:				
37)	COBOL				
38)	RPG II				
39)	RPG III				
40)	BAL				
41)	FORTRAN				
42)	PL/1				
43)	Other (please specify):				
44)	Other (please specify):				
	DATA BASE MANAGEMENT SYSTEMS:				
45)	DB2				
46)	IMS				
47)	SQL				
48)	Other (please specify):				
	INTERACTIVE/ONLINE SYSTEMS:				
49)	CICS				
50)	CSP				
51)	Other (please specify):				
52)	Other (please specify):				

10. Please indicate the mainframes currently installed in your firm/facility and those you plan to install.

	Vendor	Model/Type	Number Installed	Number Planned To Install	Operating System
53)					

11. Please provide personnel information regarding the minimum educational level, primary hiring source and entry-level annual salary range for full-time employees in your firm/facility. Referring to the scale provided below, select the number which corresponds with your response and place it in the appropriate column. Also, indicate the number of current and projected openings for each job category by placing a number in the appropriate column.

Educational Level
1 = High school diploma
2 = Certificate (6 mo.)
3 = Associate's degree (2 yr.)
4 = Bachelor's degree (4 yr.)
5 = Master's degree

Hiring Source
1 = Within data processing
2 = Within company
3 = Employment agency
4 = Community college
5 = College/university
6 = Other (please specify)

Entry-Level Annual Salary
1 = $10,000-12,999
2 = $13,000-15,999
3 = $16,000-19,999
4 = $20,000-24,999
5 = $25,000-29,999
6 = $30,000 and over

	Job Categories	Minimum Educational Level	Primary Hiring Source	Annual Salary Range	Number of Openings Oct.-Dec. 1991	1992	1993	1994
1-11)	Data Entry							
2-22)	Computer Operator							
3-33)	Operations Analyst							
4-44)	Programmer							
5-55)	Programmer/Analyst							
6-66)	Systems Analyst							
1-11)	Systems Programmer							
2-22)	Data Processing Manager							
3-33)	Other (please specify):							

12. What are your current training needs for Data Processing employees? (Place an "X" in the appropriate column for each item listed.)

		1 No Need	2 Need	3 Strong Need
34)	Basic computer concepts and terminology			
35)	Data base management			
36)	Data communications			
37)	Management information systems			
38)	Operating systems			
39)	Networking			
40)	Computer operations			
41)	Progamming languages			
42)	Interactive/online programming			
43)	Other (please specify):			

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13. If you have hired Eastern Iowa Community College District (EICCD) graduates, please indicate the direction the EICCD should take in making changes to the existing Business Computer Programming program requirements. (Place an "X" in the appropriate column for each item listed.)

		1 More Emphasis	2 Less Emphasis	No Change
44)	Accounting			
45)	Mathematics			
46)	Communications Skills			
47)	Human Relations Skills			
48)	Other (please specify):			

49) 14. Does your firm/facility currently use mid-range computers?
1. If YES, please answer the questions in Section C.
2. If NO, please skip to Section D.

SECTION C: Firms utilizing mid-range computers answer the questions in this section.

15. Which of the following programming languages, data base management systems, and interactive/online systems are used by your firm/facility? (Please place an "X" in the appropriate column for each item listed.)

		1 Not Used	2 Seldom Used	3 Used	4 Strong Use
	PROGRAMMING LANGUAGES:				
50)	COBOL				
51)	RPG II				
52)	RPG III				
53)	RPG/400				
	Other (please specify):				
54)					
	Other (please specify):				
55)					
	DATA BASE MANAGEMENT SYSTEMS:				
	Please specify:				
56)					
	Please specify:				
57)					
	INTERACTIVE/ONLINE SYSTEMS:				
	Please specify:				
58)					
	Please specify:				
59)					

16. Please indicate the mid-range computers currently installed in your firm/facility and those you plan to install.

	Vendor	Model/Type	Number Installed	Number Planned To Install	Operating System
60)					

17. Please provide personnel information regarding the minimum educational level, primary hiring source and entry-level annual salary range for full-time employees in your firm/facility. Referring to the scale provided below, select the number which corresponds with your response and place it in the appropriate column. Also, indicate the number of current and projected openings for each job category by placing a number in the appropriate column.

Educational Level
1 = High school diploma
2 = Certificate (6 mo.)
3 = Associate's degree (2 yr.)
4 = Bachelor's degree (4 yr.)
5 = Master's degree

Hiring Source
1 = Within data processing
2 = Within company
3 = Employment agency
4 = Community college
5 = College/university
6 = Other (please specify)

Entry-Level Annual Salary
1 = $10,000-12,999
2 = $13,000-15,999
3 = $16,000-19,999
4 = $20,000-24,999
5 = $25,000-29,999
6 = $30,000 and over

	Job Categories	Minimum Educational Level	Primary Hiring Source	Annual Salary Range	Number of Openings Oct.-Dec. 1991	1992	1993	1994
11-11)	Data Entry							
2-22)	Computer Operator							
3-33)	Programmer							
4-44)	Programmer/Analyst							
5-55)	Systems Analyst							
6-66)	Systems Programmer							
111-11)	Data Processing Manager							
2-22)	Other (please specify):							

18. What are your current training needs for Data Processing employees? (Place an "X" in the appropriate column for each item listed.)

		1 No Need	2 Need	3 Strong Need
23)	Basic computer concepts and terminology			
24)	Data base management			
25)	Data communications			
26)	Management information systems			
27)	Operating systems			
28)	Networking			
29)	Computer operations			
30)	Progamming languages			
31)	Application development tools			
32)	Other (please specify):			

19. If you have hired Eastern Iowa Community College District (EICCD) graduates, please indicate the direction the EICCD should take in making changes to the existing Business Computer Programming program requirements. (Place an "X" in the appropriate column for each item listed.)

		1 More Emphasis	2 Less Emphasis	3 No Change
33)	Accounting			
34)	Mathematics			
35)	Communications Skills			
36)	Human Relations Skills			
37)	Other (please specify):			

SECTION D: Training Needs and Emerging Trends.

20. What methods of training are used to update the computer skills of your employees. (Circle all that apply.)

38) 1. On-the-job training
39) 2. In-house training seminars
40) 3. External training seminars
41) 4. Community college courses
42) 5. Professional association workshop/classes
43) 6. No training provided
44) 7. Other (please specify):_____

21. What format(s) of training do you see as most beneficial for your employees? (Circle all that apply.)

45) 1. Day classes
46) 2. Evening classes
47) 3. One-day seminars
48) 4. Multiple-day seminars
49) 5. In-house training
50) 6. Other (please specify):_____

51) 22. Would your company send employees to a community college for training? (Circle one.)
1. Yes
2. No

23. What do you see as the emerging trends in the field of computers?

_____

_____

_____

_____

24. What, if any, are the implications of these "trends" on your future personnel needs?

_____

_____

_____

_____

25. What specific courses/seminars/workshops, etc., might we at the Eastern Iowa Community College District offer to meet your employee education/training needs?

_____

_____

_____

_____

26. We welcome your comments._____

_____

_____

_____

_____

_____

_____

_____

THANK YOU for completing this survey. Please return it in the enclosed postage-paid envelope to the Eastern Iowa Community College District, District Office of Academic Affairs and Planning, 306 West River Drive, Davenport, Iowa 52801.